CLAIMS

1. A method for determining a correct amount of fuel to be delivered to an engine to accomplish efficient combustion wherein the engine is being re-started after a long or short shut-off period, said method comprising the steps of:

providing a computer controller for controlling the delivery of fuel into the engine via a fuel injection system;

providing at least one air/fuel sensor heater in communication with the computer controller;

using the computer controller to determine a value of conductance of said air/fuel sensor heater;

determining an amount of fuel that should be delivered to the engine based on the value of conductance of the air/fuel sensor heater and at least one other engine parameter; and

using the computer controller to cause the fuel injection system to deliver the determined amount of fuel to the engine.

2. The method of claim 1 wherein the step of using the computer controller to determine the value of conductance is accomplished by direct measurement at the air/fuel sensor heater.

3. The method of claim 1 wherein the step of determining the value of conductance comprises using the computer controller to calculate conductance from measured impedance values at the air/fuel sensor heater.

4. The method of claim 1 wherein the value of conductance decreases as the shut-off period increases.

5. The method of claim 1 wherein the at least one other engine parameter is engine coolant temperature and intake air temperature.

6. An apparatus for controlling an amount of fuel to be delivered to an engine at restart, said system comprising:

at least one air/fuel sensor heater;

a fuel injection system; and

a computer controller in communication with said fuel injection system and said at least one air/fuel sensor heater, said computer controller operative to:

a) determine a value of conductance of said at least one air/fuel sensor heater;

b) determine an amount of fuel that should be delivered to the engine based on the value of conductance of the at least one air/fuel sensor heater and at least one other engine parameter; and

c) cause the fuel injection system to deliver the determined amount of fuel to the engine.